Analysis of Reformulated Gasoline: MTBE, Ethanol, and Alkylate Alternatives

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The Office of Research and Development's National Risk Management Research Laboratory is currently completing a streamlined Life Cycle Assessment (LCA) of the processes to generate and use reformulated gasoline, including MTBE, ethanol, and alkylate alternatives, for a vehicle traveling 12,000 miles. An LCA is a valuable analytical tool because it considers the many emission sources that can combine to produce environmental impacts and also because it considers multiple impacts. The analysis of multiple impacts is especially important because it can alert a decision maker of unexpected effects of policy/management decisions. For example, in the case of fuel additives, MTBE was introduced to improve air emissions from vehicles, but has led to problems with drinking water. Using emissions data collected in conjunction with the Office of Pollution Prevention and Toxics and the Office of Transportation and Air Quality, Life Cycle Inventory data were collected and assembled in EXCEL spreadsheets. The Tool for the Reduction and Assessment of Chemical and other environmental Impacts (TRACI) is currently being used to conduct an impact assessment comparing MTBE, ethanol, and alkylated reformulated gasoline as alternatives. The results of the study will be submitted to EPA's Office of Transportation and Air Quality for peer review and consideration in any further deliberations. While the study is expected to provide decision makers with greater information about the potential effect within select impact categories, such as ozone depletion, global warming, smog formation, acidification, eutrophication, and human health effects, it is anticipated that tradeoffs will be apparent and that none of the three systems will be the “best” in all categories. Data gaps within the systems are also being documented, which could be pursued with more detailed analysis in future efforts.